

separating a non-purified hydrogen gas from said exhausted gases;  
venting said exhausted gases free of said non-purified hydrogen;  
purifying said non-purified hydrogen gas to generate a purified H<sub>2</sub> gas; and thereafter  
introducing said purified H<sub>2</sub> gas into said reactor along with additional vapor-phase  
chemicals including pure H<sub>2</sub> gas into said reactor with sufficient supplied energy to cause a  
second reaction in said reactor.

2. (Amended) A process for recycling a vapor-phase chemical comprising:  
introducing vapor-phase chemicals including a first gas into a reactor with sufficient  
supplied energy to cause a first reaction in said reactor;  
exhausting gases from said reactor resulting from said reaction;  
separating a second gas from said exhausted gases;  
purifying said second gas to generate a third gas; and thereafter  
introducing said third gas into said reactor along with said vapor-phase chemicals  
including said first gas into said reactor with sufficient supplied energy to cause a second  
reaction in said reactor, said first and second reactions including depositing a thin film layer  
on a substrate positioned in said reactor.

3. (Twice Amended) The process of Claim 2, wherein said first gas comprises  
pure H<sub>2</sub>.

4. (Twice Amended) The process of Claim 2, wherein said second gas comprises  
non-purified H<sub>2</sub>.

5. (Twice Amended) The process of Claim 2, wherein said third gas comprises  
between about 80% to 90% of the quantity of said pure H<sub>2</sub> introduced in said reactor.

6. (Amended) The process of Claim 2, wherein the sufficient supplied energy  
comprises an RF low frequency power energy level of between about 0.318 watt/cm<sup>2</sup> to about  
3.18 watts/cm<sup>2</sup>.

7. (Amended) The process of Claim 2, wherein said reactor comprises a tapered  
outer shell surrounding a tapered susceptor.

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16. (Amended) The process of Claim 2, wherein said third gas comprises purified H<sub>2</sub>.

Please cancel Claims 17-22.

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23. (Amended) The process of Claim 2, wherein said vapor-phase chemicals comprise gases selected from the group consisting of NH<sub>3</sub>, N<sub>2</sub>O, SiF<sub>4</sub>, SiH<sub>4</sub>, TiCl<sub>4</sub>, N<sub>2</sub>, Ar, HCl, and SiCl<sub>4</sub>.

24. A process for recycling a by-product of a chemical reaction comprising:  
introducing vapor-phase chemicals including first use hydrogen into a reactor with sufficient supplied energy to cause a first reaction for depositing a thin film layer on a substrate positioned in said reactor;  
moving said second use hydrogen through a filter to convert said second use hydrogen to processing quality hydrogen; and thereafter  
introducing said processing quality hydrogen into said reactor with said vapor-phase chemicals to be used in a second reaction for depositing a thin film layer on a substrate positioned in said reactor.

25. The process of Claim 24, wherein said processing quality hydrogen comprises between about 80% to 90% of the quantity of said first use hydrogen introduced in said reactor.

26. The process of Claim 24, wherein the sufficient supplied energy comprises an RF low frequency power energy level of between about 0.318 watt/cm<sup>2</sup> to about 3.18 watts/cm<sup>2</sup>.

27. The process of Claim 24, wherein said reactor comprises a tapered outer shell surrounding a tapered susceptor.

28. The process of Claim 24, wherein said vapor-phase chemicals comprise gases selected from the group consisting of NH<sub>3</sub>, N<sub>2</sub>O, SiF<sub>4</sub>, SiH<sub>4</sub>, TiCl<sub>4</sub>, N<sub>2</sub>, Ar, HCl, and SiCl<sub>4</sub>.

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